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10/776,061	02/11/2004	Manish Sharma	200310026-1	2092

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EXAMINER	
SOFOCLEOUS, ALEXANDER	

ART UNIT	PAPER NUMBER
2824	

DATE MAILED: 02/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/776,061	SHARMA, MANISH	
	Examiner	Art Unit	
	Alexander Sofocleous	2824	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 January 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 February 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☒ Other: *search history*.

DETAILED ACTION

1. This action is responsive to the following communications: Amendment of January 17, 2006.

2. Claims 1-16 are pending in the case. Claims 1, 12, and 13 are independent claims.

Response to Amendment

3. The proposed correction to claim 6 was received on January 17, 2006 and accepted. However, It is noted that the claims received indicate claims 4, 5, 7, 10, and 13 as being original but have misspellings in the preamble (claim 4: "NRAM" should be --MRAM--; claim 5: "MRIN" should be --MRAM--; claim 7: "MRAN" should be --MRAM--; claim 10: "MRAN" should be --MRAM--; claim 13: "MRAN" should be --MRAM--). It is recommended that Applicant carefully review the claim amendment and resubmit a copy of the claims for the record.

4. The proposed corrections to the specification were received on January 17, 2006 and are accepted.

Response to Arguments

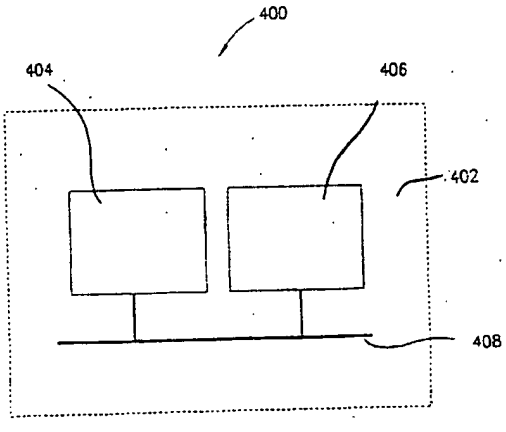
5. Attorney Ashok Mannava's statement of common ownership (Hewlett-Packard) with respect to instant application, Tran (U.S. Patent 6,856,105), and Perner et al. (U.S. Patent Application Publication 2005/0169034) is acknowledged.

Applicant's arguments, see page 8 (Evidence of Common Ownership), filed January 17, 2006, with respect to the rejections of claims 1-5 and 11-15 under U.S.C. 103(a) (Tran in view of Ohmori, and Perner in view of Ohmori) have been fully considered and are persuasive. Therefore, these rejections of 1-5 and 11-15 have been withdrawn.

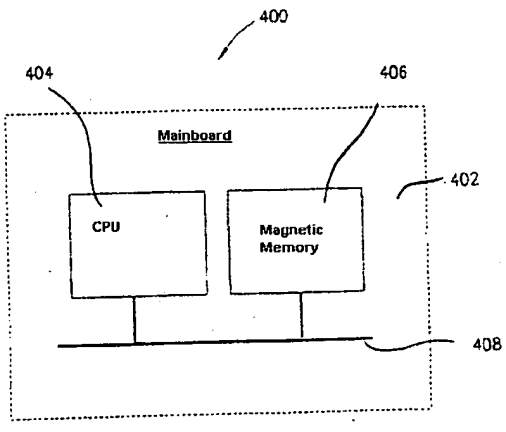
However, upon further consideration, a new ground(s) of rejection is made in view of a different interpretation of the previously applied reference and newly found prior art. Previously applied reference Ohmori discloses methods for heating MRAM and is applicable to method claims 13-16. Newly found prior art Tang and Leuschner disclose methods for heating MRAM and are applicable to method claims 13-16.

Drawings

6. The drawings are objected to because the unlabeled rectangular box(es) shown in the drawings (Fig. 4) should be provided with descriptive text labels. For clarity purposes, Examiner suggests the following proposed correction for Figure 4:



OLD



PROPOSED CORRECTION

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent

granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. **Claim 13 is rejected under 35 U.S.C. 102(b) as being anticipated by Abraham et al. (U.S. Patent 6,385,082).** Abraham et al. show an MRAM device (Fig. 1) comprising an array of MRAM cells (Fig. 1 [50]) which are switchable between two states under the influence of a magnetic field, each MRAM cell (Fig. 1 [50]) comprising a reference layer (Fig. 5 [52]) and a data layer (Fig. 5 [51]).

Abraham et al. disclose heating the data layer (Fig. 5 [51]; column 5, lines 50-54).

Abraham et al. disclose utilizing the generated heat to reduce the coercivity of the data layer (Fig. 5 [51]) to facilitate switching of the data layer (column 5, lines 58-60).

9. **Claim 13 is rejected under 35 U.S.C. 102 (a) or 35 U.S.C. 102(e) as being anticipated by Leuschner (U.S. Patent Application Publication 2003/0206434).** Leuschner shows an MRAM device (Fig. 1) comprising an array (Fig. 1 [40]) of MRAM cells (Fig. 1 [14]) which are switchable between two states under the influence of a magnetic field, each MRAM cell (Fig. 2 [14]) comprising a reference layer (Fig. 2 [16]) and a data layer (Fig. 2 [20]).

Leuschner discloses heating the data layer (Fig. 2 [20]; paragraph 0037).

Leuschner discloses utilizing the generated heat to reduce the coercivity of the data layer (Fig. 2 [20]) to facilitate switching of the data layer (paragraph 0041).

10. **Claims 13-16 are rejected under 35 U.S.C. 102(e) as being anticipated by Tang (U.S. Patent Application Publication 2004/0057263).**

Regarding independent claim 13, Tang shows an MRAM device (Fig. 4) comprising an array of MRAM cells (Fig. 1 [11]; see paragraph 0031) which are switchable between two states under the influence of a magnetic field, each MRAM cell (Fig. 1 [11]) comprising a reference layer and a data layer (see paragraph 0040 [pinned layer, free layer]).

Tang discloses heating the data layer (paragraph 0040).

Tang discloses utilizing the generated heat to reduce the coercivity of the data layer to facilitate switching of the data layer (paragraph 0040).

Regarding dependent claims 14-16, Tang shows a resistive heat-inducing layer (Fig. 1 [14]) that heats the data layer by a current (paragraph 0040).

11. **Claims 13-16 are rejected under 35 U.S.C. 102(e) as being anticipated by Ohmori (U.S. Patent 6,920,065).**

Regarding independent claim 13, Ohmori discloses an MRAM device comprising an array of MRAM cells (Fig. 11 [40]; see column 15, lines 58-60) which are switchable between two states under the influence of a magnetic field, each MRAM cell (Fig. 11 [40]) comprising a reference layer (Fig. 11 [15]) and a data layer (Fig. 11 [13]).

Ohmori discloses heating the data layer (Fig. 11 [13]; column 15, lines 33-35).

Ohmori discloses utilizing the generated heat to reduce the coercivity of the data layer (Fig. 11 [13]) to facilitate switching of the data layer (column 6, lines 59-67; column 18, lines 7-10).

Regarding dependent claims 14-16, Ohmori shows a resistive heat-inducing layer (Fig. 11 [27]) that heats the data layer (Fig. 11 [13]) by a current (column 15, lines 38-39).

Double Patenting

12. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

13. **Claims 1-16 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-15 of copending Sharma U.S. Patent Application No. 2005/0173771A1 in view of Ohmori U.S. Patent No, 6,920,065B2.** Although the conflicting claims are not identical, they are similar except that Sharma '828A1 is drawn to heating the data layer while Sharma

'771A1 is drawn to heating the reference layer. Ohmori '065B2 shows that the data layer (Ohmori '065B2 Fig. 1 [13]) is heated by a heating element (Ohmori '065B2 Fig. 1[21]) that is proximate to the data layer.

This is a provisional obviousness-type double patenting rejection.

Regarding independent claim 1, Sharma '771A1's claim 1 shows an MRAM device comprising: a plurality of magnetic memory cells; a plurality of word and bit lines connecting columns and rows of the memory cells, each memory cell having a magnetic reference layer and a magnetic data layer, each magnetic reference layer and each magnetic data layer having a magnetization being switchable between two states under the influence of a magnetic field; and a plurality of heating elements each proximate to a respective reference layer, each heating element in use providing for localized heating of the respective reference layer so as to facilitate switching of the reference layer. Sharma '771A1's claim 2 shows that, at a first temperature, the reference layer is of a lower coercivity than the data layer. However, Sharma '771A1 is drawn to heating the reference layer instead of heating the data layer. Ohmori '065B2 shows that the data layer (Ohmori '065B2 Fig. 1 [13]) is heated by a heating element (Ohmori '065B2 Fig. 1[21]) that is proximate to the data layer.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the teachings of Ohmori '065B2, with respect to adding a heating element proximate to the data layer of the memory device, as opposed to adding a heating element proximate to the reference layer, in a way similar to Sharma '771A1 such that the data layer is heated by the heating element in order to reduce the coercive

force of the data layer (Ohmori '065B2 column 18, lines 7-10). Further motivation to perform the above stated modification are evidented by the fact that both Ohmori '065B2 and Sharma '771A1 are from the same field of endeavor such as being MRAM with memory cells that have a data layer, reference layer, and intermediate layer, involving heating a layer of the memory cell, and also being classified under U.S. Cl. 365 (static memories).

Regarding dependent claim 2, it is evident with respect to the claim limitations discussed above that the data layer has a higher coercivity than the reference layer at an initial temperature. As the data layer is heated, the coercivity of the data layer decreases (Ohmori '065B2 column 18, lines 7-10) from the initial coercivity, which is still higher than the coercivity of the reference layer.

Regarding dependent claim 3, it is evident with respect to the claim limitations discussed above that heating the data layer, in order to lower the coercivity of the data layer (Ohmori '065B2 column 18, lines 7-10), eventually results in the coercivity of the data layer decreasing lower than that of the reference layer.

Regarding dependent claims 4-8, Sharma '771A1's claims 3-5 and 7-8 further recite additional limitations that are the same as those in present claims 4-8.

Regarding dependent claims 9-10, Sharma '771A1's claims 6 and 9 further recite additional limitations that are the same as those in present claims 9-10.

Regarding dependent claim 11, Sharma '771A1's claim 10 further recite additional limitations that are the same as those in present claim 11.

Regarding independent claims 12, Sharma '771A1's claim 11 combined with Sharma '771A1's claim 2 further recites additional limitations that are the same as those in present claim 12. However, Sharma '771A1 is drawn to heating the reference layer instead of heating the data layer. Ohmori '065B2 shows that the data layer (Ohmori '065B2 Fig. 1 [13]) is heated by a heating element (Ohmori '065B2 Fig. 1[21]) that is proximate to the data layer.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the teachings of Ohmori '065B2, with respect to adding a heating element proximate to the data layer of the memory device, as opposed to adding a heating element proximate to the reference layer, in a way similar to Sharma '771A1 such that the data layer is heated by the heating element in order to reduce the coercive force of the data layer (Ohmori '065B2 column 18, lines 7-10). Further motivation to perform the above stated modification are evidented by the fact that both Ohmori '065B2 and Sharma '771A1 are from the same field of endeavor such as being MRAM with memory cells that have a data layer, reference layer, and intermediate layer, involving heating a layer of the memory cell, and also being classified under U.S. Cl. 365 (static memories).

Regarding claims 13-16, Sharma '771A1's 12-15 further recite additional limitations that are the same as those in present claims 13-16, except for the data layer being heated. Ohmori '065B2 shows that the data layer (Ohmori '065B2 Fig. 1 [13]) is heated by a heating element (Ohmori '065B2 Fig. 1[21]) that is proximate to the data layer.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the teachings of Ohmori '065B2, with respect to adding a heating element proximate to the data layer of the memory device, as opposed to adding a heating element proximate to the reference layer, in a way similar to Sharma '771A1 such that the data layer is heated by the heating element in order to reduce the coercive force of the data layer (Ohmori '065B2 column 18, lines 7-10). Further motivation to perform the above stated modification are evidented by the fact that both Ohmori '065B2 and Sharma '771A1 are from the same field of endeavor such as being MRAM with memory cells that have a data layer, reference layer, and intermediate layer, involving heating a layer of the memory cell, and also being classified under U.S. Cl. 365 (static memories).

Conclusion

When responding to this office action, applicants are advised to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist the examiner in locating appropriate paragraphs.

A shortened statutory period for response to this action is set to expire three months and zero days from the date of this letter. Failure to respond within the period for response will cause this application to become abandoned (see MPEP 710.02(b)).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander Sofocleous whose telephone number is 571-272-0635. The examiner can normally be reached on 7:00am - 4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Elms can be reached on 571-272-1869. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AGS

2/6/06

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